

# **Dietary Exposure to PCBs or PAHs: Do They Affect the Innate and Acquired Disease Resistance of Chinook Salmon to *Listonella anguillarum*?**

**David B. Powell and Roger C. Palm, Jr.**  
*ProFishent Inc.*

**Ann Skillman**  
*Battelle Marine Science Laboratory*

**Kathy Godtfredsen**  
*Windward Environmental LLC*

## **Abstract**

Controlled laboratory challenges with *Listonella (Vibrio) anguillarum* bacteria were used to determine the effects of dietary exposure to Aroclor® 1254 (PCBs), or to a mixture of 14 polyaromatic hydrocarbon compounds (PAHs), on the immunocompetence of juvenile chinook salmon. Independent groups of salmon were fed different concentrations of PCBs or PAHs for a period of four weeks. These doses were designed to bracket the reported levels of these environmental contaminants in the stomach contents of Puget Sound salmon. To examine the effects on innate immunity, half of the fish were randomly assigned to replicate tanks, then challenged with pathogenic *L. anguillarum* and monitored for 14 days. Subsequently, the other half of the contaminant-dosed fish were vaccinated (excluding controls) and transferred to replicate challenge tanks. Specific immunity was allowed to develop for three weeks prior to bacterial challenge. All mortalities were individually necropsied and sampled for bacteria to identify the cause of death. In one test, significant non-*Listonella* bacterial infections occurred as the fish transitioned into smolts toward the end of the study following vaccination. This test was repeated the following year with fish and resulted in a much lower incidence of non-*Listonella* mortalities. A separate oral LD50 test that was run to measure acute toxicity revealed no mortality over 96 hours, despite doses as high as 800 mg Aroclor 1254 per kg fish. The challenge data indicated that dietary PCB or PAH exposures, even at relatively high levels, did not have a significant effect on growth, innate disease resistance, or acquired immunity to *Listonella anguillarum*.

More complete information providing the basis for this research can be found in the following publications:

Powell DB, Palm Jr. RC, Skillman A, and Godtfredsen K. 2003. Immunocompetence of chinook salmon against *Listonella anguillarum* following dietary exposure to Aroclor® 1254. *Environ. Toxicol. Chem.* Vol. 22 No. 2, pp 285-295.

Palm Jr. RC, Powell DB, Skillman A, and Godtfredsen K. 2003. Immunocompetence of juvenile chinook salmon against *Listonella anguillarum* following dietary exposure to polycyclic aromatic hydrocarbons. *Environ. Toxicol. Chem.* (In Press).